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**DELINEATION OF SOIL TEMPERATURE
REGIMES FROM HCM DATA**

(E82-10393) DELINEATION OF SOIL TEMPERATURE
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Type II

A. Objectives of Contract

An investigation is proposed in which remotely sensed data from the HCMH and Landsat satellites will be evaluated as input into the National Cooperative Soil Survey. The objectives of the project are to:

- 1) determine the feasibility of using HCMH and ancillary data to measure soil surface and plant canopy temperatures and to thereby delineate and map soils into their respective soil temperature regimes; and
- 2) develop and evaluate techniques for using HCMH and HCMH-Landsat merged data for input to the National Cooperative Soil Survey.

B. Activities During Reporting Period

- 1) A fifth and final HCMH scene has been subset and registered to the existing data set. Average daily temperatures (ADT) were calculated for all five dates by averaging raw daytime temperature (DAY-IR) and nighttime temperature (NIGHT-IR) values using SUBTRAN program.
- 2) Mean annual soil temperatures (MAST) have been calculated using ADT values as input into a linearized one-dimensional heat-flow equation describing the theoretical temperature response curve at the earth's surface. The annual amplitude (AMP) of the response curve has also been calculated showing the temperature variation during one year.
- 3) ADT values were adjusted to compensate for temperature variations due to weather patterns occurring at the time of HCMH data collection. Air temperatures were used to calculate adjusted ADT and MAST values.
- 4) Versatec plots of MAST and AMP have been generated showing their spatial distribution. Materials have been obtained to produce photographic multicolor display products.
- 5) Study site field survey and cooperation with local SCS and BLM personnel in Moab, Utah facilitated evaluation of MAST and AMP calculations and provided familiarization with site characteristics (see Trip Report).

C. Planned Activity

- 1) Rectify MAST and AMP imagery to a 1:250,000 scale topographic base map. Produce transparencies of MAST and AMP imagery to overlay onto base map for improved interpretation of delineations.
- 2) Complete registration of HCMH and Digital Terrain Elevation (DTE) data to evaluate relationships between MAST, AMP, aspect and elevation.

- 3) Register HCMM data with Landsat data to determine the effectiveness of HCMM data in discriminating between selected surface features.

D. Potential Problem Areas

- 1) The accuracy of Landsat and HCMM registration may be a predominant factor in determining the size and types of categories which can be used to measure the effects of HCMM on category discrimination.
- 2) Due to the lateness of data acquisition and subsequent errors within the data, it will be difficult to complete the project before the end of the 1982 calendar year.